# Curriculum Vitae

Oliver Sølund Kirsebom 3445 Stanbury St Halifax, Nova Scotia B3L 2X1, Canada

Phone: +1 902-209-9788 Email: oliver.kirsebom@gmail.com Homepage: oliskir.github.io ORCID ID: 0000-0001-5843-7465

#### **Brief Bio**

I hold a PhD in Nuclear Physics from Aarhus University, Denmark. For more than ten years, I was a frequent visitor at large international accelerator laboratories such as CERN in Switzerland where I led a number successful experimental collaborations, which have advanced our understanding of the nuclear processes that generate energy and transmute chemical elements in the interiors of stars. Eager to put my knowledge and analytical skills to use in a more applied setting, I joined the MERIDIAN project in 2018. Based at the Institute for Big Data Analytics at Dalhousie University, Canada, I am now leading a team of data scientists and software developers in creating novel data analytics and modeling tools for use in underwater acoustics.

# **Employment History**

2020-Present: Senior Staff Scientist at Institute for Big Data Analytics, Dalhousie University

2019-Present: Adjunct Professor at Faculty of Computer Science, Dalhousie University

2018–2020: Lead Acoustic Data Analyst at Institute for Big Data Analytics, Dalhousie University

2015–2018: Assistant Professor at Department of Physics and Astronomy, Aarhus University

2013–2015: Postdoc at Department of Physics and Astronomy, Aarhus University

2010-2013: Postdoc at TRIUMF

# University Education

2006–2010: PhD Physics, Aarhus University

2005–2006: Fulbright student, University of Washington

2002–2005: BSc Physics and Mathemathics, Aarhus University

## Grants and Awards<sup>1</sup>

2020: Ocean Frontier Institute Visiting Fellowship, 5k

2019: NVIDIA Accelerated Data Science GPU Grant, 3k

2015-2018: "Nuclear astrophysics at the precision frontier", The Villum Foundation Young Investigator Programme, 580k

2010-2012: "Experiments in nuclear astrophysics with radioactive beams at the ISAC-II facility at TRIUMF", The Villum Foundation Postdoc Fellowship, 190k

2007: Foreign Graduate Student Invitation Program Grant, Tokyo Institute of Technology, Japan

2005: The Danish-American Fulbright Commission, 17k

2005: Nordea Danmark-fonden, 4.0k

2005: Faculty of Science, Aarhus University, 1.9k

2005: Etatsråd CG Filtenborg og Hustru Marie Filtenborgs Studielegat, 1.0k

2005: Observator mag.scient Julie Marie Vinter Hansens Rejselegat, 1.0k

2002: International Physics Olympiad Honorable Mention

<sup>&</sup>lt;sup>1</sup>Grant amount in CAD

## **Publications**

Over 40 peer-reviewed research articles (14 first authorships), 23 conference proceedings, and 3 feature articles. 469 citations (377 without self citations), h-index of 12, and 8.23 citations per item.<sup>2</sup> A few key publications are listed below. For a complete list, see page 4.

- O. S. Kirsebom, et al., 2020. Performance of a deep neural network at detecting North Atlantic right whale upcalls, The Journal of the Acoustical Society of America 147, 2636–2646. Citations: 0
- O. S. Kirsebom, et al., 2019. Discovery of an Exceptionally Strong  $\beta$ -Decay Transition of  $^{20}F$  and Implications for the Fate of Intermediate-Mass Stars, Physical Review Letters 123, 262701. Citations: 0
- O. S. Kirsebom, et al., 2018. First Accurate Normalization of the  $\beta$ -delayed  $\alpha$  Decay of <sup>16</sup>N and Implications for the <sup>12</sup>C( $\alpha$ ,  $\gamma$ )<sup>16</sup>O Astrophysical Reaction Rate, Physical Review Letters **121**, 142701. Citations: 1
- O. S. Kirsebom, et al., 2012. Improved Limit on Direct α Decay of the Hoyle State, Physical Review Letters 108, 202501. Citations: 50
- O. S. Kirsebom and B. Davids, 2011. One fewer solution to the cosmological lithium problem, Physical Review C 84, 058801. Citations: 35
- O. S. Kirsebom, et al., 2011. Precise and accurate determination of <sup>8</sup>B decay spectrum, Physical Review C 83, 065802. Citations: 18
- O. S. Kirsebom, et al., 2010. Breakup of <sup>12</sup>C resonances into three α particles, Physical Review C 81, 064313.

  Citations: 51
- O. S. Kirsebom, et al., 2009. Observation of  $\gamma$ -delayed  $3\alpha$  breakup of the 15.11 and 12.71 MeV states in  $^{12}C$ , Physics Letters B **680**, 44–49. Citations: 21

## Software

- 2020: kadlu, docs.meridian.cs.dal.ca/kadlu/, M. Smith and O. S. Kirsebom
- 2019: ketos, docs.meridian.cs.dal.ca/ketos/, F. Frazao and O. S. Kirsebom
- 2018: simX, 10.5281/zenodo.1320121, M. Munch and J. H. Jensen and O. S. Kirsebom
- 2018: Open R-matrix (ORM), 10.5281/zenodo.1174079, M. Munch and O. S. Kirsebom and J. Refsgaard

#### Talks

Numerous (> 50) presentations at international conferences and workshops including several invited talks. For a complete list, see oliskir.github.io.

# Spokespersonships (P.I.)

- 2015–2018: Search for the 2nd-forbidden ground-state transition in the  $\beta$  decay of  $^{20}F$ , JYFL
- 2015–2018: Absolute measurement of the  $\beta\alpha$  decay of <sup>16</sup>N, ISOLDE
- 2012–2015:  $\beta$ -delayed  $\alpha$ -decay study of <sup>16</sup>N using the implantation method, KVI
- 2011–2015: Lifetime Measurement of the 7.786 MeV State in <sup>23</sup>Mq, TRIUMF

## Teaching

- 2013–2017: Extracurricular programme for 1st-year students, Coordinator
- 2015: Nuclear astrophysics graduate course, Lecturer
- 2014: Electromagnetism laboratory course, Coordinator
- 2006–2010: Physics and mathematics undergraduate courses, Teaching Assistant

<sup>&</sup>lt;sup>2</sup>Source: Web of Science, 2020.01.03.

## Student Supervision

2019–2020: Xuhui Liu, MSc Computer Science, Dalhousie University (co-supervisor)

2016–2017: Helle Bisgaard Sørensen, MSc Physics, Aarhus University

2014–2015: Sofie Tilbæk Nielsen, BSc Physics, Aarhus University

# Conference and Workshop Organization

21-22 Nov 2019: Organizer of the workshop "Detection and Classification in Marine Bioacoustics with Deep Learning" with approx. 30 participants from Canada, the U.S. and Europe.

## Academic Services

2016–2018: Member of the Liaison Committee at the Department of Physics and Astronomy, Aarhus University

## Refereeing

Physics Review Letters, Physical Review C, The Astrophysical Journal, Journal of the Acoustical Society of America, Hyperfine Interactions, Methods in Ecology and Evolution.

# **Professional Memberships**

2018–Present: Member of the Canadian Acoustical Association

2013-2018: Member of the Danish Physical Society

# **Publications**

## Research Articles

- N. J. Hubbard, C. A. Diget, S. P. Fox, H. O. U. Fynbo, A. M. Howard, O. S. Kirsebom, A. M. Laird, M. Munch, A. Parikh, M. Pignatari, and J. R. Tomlinson. New Experimental 23Na(, p)26Mg Reaction Rate for Massive Star and Type Ia Supernova Models. The Astrophysical Journal 912, 59 (2021), URL http://dx.doi.org/10.3847/1538-4357/abee91
- B. Padovese, F. Frazao, O. S. Kirsebom, and S. Matwin. Data augmentation for the classification of North Atlantic right whales upcalls. The Journal of the Acoustical Society of America 149, 2520–2530 (2021), URL http://dx.doi.org/10.1121/10.0004258
- O. S. Kirsebom, A. M. Howard, M. Munch, S. Sablok, J. A. Swartz, and H. O. U. Fynbo. Experimental study of the  $^{11}B(p,3\alpha)\gamma$  reaction at  $E_p=0.5$ –2.7 MeV. The European Physical Journal A **56**, 179 (2020), URL http://dx.doi.org/10.1140/epja/s10050-020-00183-z
- O. S. Kirsebom, F. Frazao, Y. Simard, N. Roy, S. Matwin, and S. Giard. *Performance of a deep neural network at detecting North Atlantic right whale upcalls.* The Journal of the Acoustical Society of America 147, 2636–2646 (2020), URL http://dx.doi.org/10.1121/10.0001132
- M. Munch, O. S. Kirsebom, J. A. Swartz, and H. O. U. Fynbo. Resolving the  $^{11}B(p,\alpha_0)$  cross-section discrepancies between 0.5 and 3.5 MeV. The European Physical Journal A **56**, 17 (2020), URL http://dx.doi.org/10.1140/epja/s10050-019-00016-8
- O. S. Kirsebom, S. Jones, D. F. Strömberg, G. Martínez-Pinedo, K. Langanke, F. K. Röpke, B. A. Brown, T. Eronen, H. O. U. Fynbo, M. Hukkanen, A. Idini, A. Jokinen, A. Kankainen, J. Kostensalo, I. Moore, H. Möller, S. T. Ohlmann, H. Penttilä, K. Riisager, S. Rinta-Antila, P. C. Srivastava, J. Suhonen, W. H. Trzaska, and J. Äystö. Discovery of an Exceptionally Strong β-Decay Transition of <sup>20</sup>F and Implications for the Fate of Intermediate-Mass Stars. Phys. Rev. Lett. 123, 262701 (2019), URL http://dx.doi.org/10.1103/PhysRevLett.123.262701
- O. S. Kirsebom, M. Hukkanen, A. Kankainen, W. H. Trzaska, D. F. Strömberg, G. Martínez-Pinedo, K. Andersen, E. Bodewits, B. A. Brown, L. Canete, J. Cederkäll, T. Enqvist, T. Eronen, H. O. U. Fynbo, S. Geldhof, R. de Groote, D. G. Jenkins, A. Jokinen, P. Joshi, A. Khanam, J. Kostensalo, P. Kuusiniemi, K. Langanke, I. Moore, M. Munch, D. A. Nesterenko, J. D. Ovejas, H. Penttilä, I. Pohjalainen, M. Reponen, S. Rinta-Antila, K. Riisager, A. de Roubin, P. Schotanus, P. C. Srivastava, J. Suhonen, J. A. Swartz, O. Tengblad, M. Vilen, S. Vínals, and J. Äystö. *Measurement of the* 2<sup>+</sup> → 0<sup>+</sup> ground-state transition in the β decay of <sup>20</sup>F. Phys. Rev. C **100**, 065805 (2019), URL http://dx.doi.org/10.1103/PhysRevC.100.065805
- B. Davids, M. Williams, N. E. Esker, M. Alcorta, D. Connolly, B. R. Fulton, K. Hudson, N. Khan, O. S. Kirsebom, J. Lighthall, and P. Machule. *Initial operation of the recoil mass spectrometer EMMA at the ISAC-II facility of TRIUMF*. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 930, 191–195 (2019), URL http://dx.doi.org/https://doi.org/10.1016/j.nima.2019.03.070
- O. S. Kirsebom, O. Tengblad, R. Lica, M. Munch, K. Riisager, H. O. U. Fynbo, M. J. G. Borge, M. Madurga, I. Marroquin, A. N. Andreyev, T. A. Berry, E. R. Christensen, P. D. Fernández, D. T. Doherty, P. Van Duppen, L. M. Fraile, M. C. Gallardo, P. T. Greenlees, L. J. Harkness-Brennan, N. Hubbard, M. Huyse, J. H. Jensen, H. Johansson, B. Jonson, D. S. Judson, J. Konki, I. Lazarus, M. V. Lund, N. Marginean, R. Marginean, A. Perea, C. Mihai, A. Negret, R. D. Page, V. Pucknell, P. Rahkila, O. Sorlin, C. Sotty, J. A. Swartz, H. B. Sørensen, H. Törnqvist, V. Vedia, N. Warr, and H. De Witte. First Accurate Normalization of the β-delayed α Decay of <sup>16</sup>N and Implications for the <sup>12</sup>C(α, γ) <sup>16</sup>O Astrophysical Reaction Rate. Physical Review Letters 121, 142701 (2018), URL http://dx.doi.org/10.1103/PhysRevLett.121.142701

- M. Dahl, A. Brun, O. S. Kirsebom, and G. Andresen. *Improving Short-Term Heat Load Forecasts with Calendar and Holiday Data*. Energies 11, 1678 (2018), URL http://dx.doi.org/10.3390/en11071678
- M. Munch, O. S. Kirsebom, J. A. Swartz, K. Riisager, and H. O. U. Fynbo. *Measurement of the full excitation spectrum of the* <sup>7</sup>*Li*(*p,γ*)αα reaction at 441 keV. Physics Letters B **782**, 779–784 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.06.013
- J. Refsgaard, H. O. U. Fynbo, O. S. Kirsebom, and K. Riisager. *Three-body effects in the Hoyle-state decay*. Physics Letters B **779**, 414–419 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.02.031
- V. Pesudo, M. J. G. Borge, A. M. Moro, J. A. Lay, E. Nácher, J. Gómez-Camacho, O. Tengblad, L. Acosta, M. Alcorta, M. A. G. Alvarez, C. Andreoiu, P. C. Bender, R. Braid, M. Cubero, A. D. Pietro, J. P. Fernández-García, P. Figuera, M. Fisichella, B. R. Fulton, A. B. Garnsworthy, G. Hackman, U. Hager, O. S. Kirsebom, K. Kuhn, M. Lattuada, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, C. Unsworth, and Z. M. Wang. Scattering of the Halo Nucleus <sup>11</sup>Be on <sup>197</sup>Au at Energies around the Coulomb Barrier. Physical Review Letters 118, 152502 (2017), URL http://dx.doi.org/10.1103/physrevlett.118.152502
- M. V. Lund, A. Andreyev, M. J. G. Borge, J. Cederkll, H. D. Witte, L. M. Fraile, H. O. U. Fynbo, P. T. Greenlees, L. J. Harkness-Brennan, A. M. Howard, M. Huyse, B. Jonson, D. S. Judson, O. S. Kirsebom, J. Konki, J. Kurcewicz, I. Lazarus, R. Lica, S. Lindberg, M. Madurga, N. Marginean, R. Marginean, I. Marroquin, C. Mihai, M. Munch, E. Nacher, A. Negret, T. Nilsson, R. D. Page, S. Pascu, A. Perea, V. Pucknell, P. Rahkila, E. Rapisarda, K. Riisager, F. Rotaru, C. Sotty, M. Stanoiu, O. Tengblad, A. Turturica, P. V. Duppen, V. Vedia, R. Wadsworth, and N. Warr. Beta-delayed proton emission from <sup>20</sup>Mg. The European Physical Journal A 52, 304 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16304-x
- K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. Complete kinematical study of the 3α breakup of the 16.11 MeV state in <sup>12</sup>C. The European Physical Journal A 52, 271 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16271-2
- M. Munch, M. Alcorta, H. O. U. Fynbo, M. Albers, S. Almaraz-Calderon, M. L. Avila, A. D. Ayangeakaa, B. B. Back, P. F. Bertone, P. F. F. Carnelli, M. P. Carpenter, C. J. Chiara, J. A. Clark, B. DiGiovine, J. P. Greene, J. L. Harker, C. R. Hoffman, N. J. Hubbard, C. L. Jiang, O. S. Kirsebom, T. Lauritsen, K. L. Laursen, S. T. Marley, C. Nair, O. Nusair, D. Santiago-Gonzalez, J. Sethi, D. Seweryniak, R. Talwar, C. Ugalde, and S. Zhu. Independent measurement of the Hoyle state β feeding from <sup>12</sup>B using Gammas-phere. Physical Review C 93, 065803 (2016), URL http://dx.doi.org/10.1103/physrevc.93.065803
- O. S. Kirsebom, P. Bender, A. Cheeseman, G. Christian, R. Churchman, D. S. Cross, B. Davids, L. J. Evitts, J. Fallis, N. Galinski, A. B. Garnsworthy, G. Hackman, J. Lighthall, S. Ketelhut, P. Machule, D. Miller, S. T. Nielsen, C. R. Nobs, C. J. Pearson, M. M. Rajabali, A. J. Radich, A. Rojas, C. Ruiz, A. Sanetullaev, C. D. Unsworth, and C. Wrede. *Measurement of lifetimes in* <sup>23</sup>Mg. Physical Review C 93, 025802 (2016), URL http://dx.doi.org/10.1103/physrevc.93.025802
- J. Refsgaard, O. Kirsebom, E. Dijck, H. Fynbo, M. Lund, M. Portela, R. Raabe, G. Randisi, F. Renzi, S. Sambi, A. Sytema, L. Willmann, and H. Wilschut. Measurement of the branching ratio for β-delayed α decay of <sup>16</sup>N. Physics Letters B 752, 296–301 (2016), URL http://dx.doi.org/10.1016/j.physletb. 2015.11.047
- K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. Unbound states in  $^{12}C$  populated by  $\gamma$ -decay of the  $(J^{\pi}, T) = (2^+, 1)$  16.11 MeV state. The European Physical Journal A 52, 370 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16370-0
- V. Margerin, G. Lotay, P. J. Woods, M. Aliotta, G. Christian, B. Davids, T. Davinson, D. T. Doherty, J. Fallis, D. Howell, O. S. Kirsebom, D. J. Mountford, A. Rojas, C. Ruiz, and J. A. Tostevin. Inverse Kinematic Study of the <sup>26g</sup>Al(d, p)Al<sup>27</sup> Reaction and Implications for Destruction of <sup>26</sup>Al in Wolf-Rayet and Asymptotic Giant Branch Stars. Physical Review Letters 115, 062701 (2015), URL http://dx.doi.org/10.1103/physrevlett.115.062701

- A. M. Howard, M. Munch, H. O. U. Fynbo, O. S. Kirsebom, K. L. Laursen, C. A. Diget, and N. J. Hubbard. 
  <sup>23</sup>Na(α, p)<sup>26</sup>Mg Reaction Rate at Astrophysically Relevant Energies. Physical Review Letters 115, 052701 
  (2015), URL http://dx.doi.org/10.1103/physrevlett.115.052701
- O. S. Kirsebom, H. O. U. Fynbo, K. Riisager, R. Raabe, and T. Roger. Analysis of the response of silicon detectors to α particles and <sup>16</sup>O ions. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 758, 57–61 (2014), URL http://dx.doi.org/10.1016/j.nima.2014.05.005
- K. L. Laursen, O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. High-statistics measurement of the  $\beta$ -delayed  $\alpha$  spectrum of  $^{20}Na$ . The European Physical Journal A 49, 79 (2013), URL http://dx.doi.org/10.1140/epja/i2013-13079-6
- M. J. G. Borge, L. M. Fraile, H. O. U. Fynbo, B. Jonson, O. S. Kirsebom, T. Nilsson, G. Nyman, G. Possnert, K. Riisager, and O. Tengblad. Rare βp decays in light nuclei. Journal of Physics G: Nuclear and Particle Physics 40, 035109 (2013), URL http://dx.doi.org/10.1088/0954-3899/40/3/035109
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, H. O. U. Fynbo, M. Madurga, and O. Tengblad. Observation of α decay from a state in <sup>10</sup>B at 11.48 MeV. Physical Review C 85, 054308 (2012), URL http://dx.doi.org/10.1103/physrevc.85.054308
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, B. Jonson, M. Madurga, T. Nilsson, G. Nyman, K. Riisager, O. Tengblad, and M. Turrión. Improved Limit on Direct α Decay of the Hoyle State. Physical Review Letters 108, 202501 (2012), URL http://dx.doi.org/10.1103/physrevlett.108.202501
- T. Roger, J. Büscher, B. Bastin, O. S. Kirsebom, R. Raabe, M. Alcorta, J. Äystö, M. J. G. Borge, M. Carmona-Gallardo, T. E. Cocolios, J. Cruz, P. Dendooven, L. M. Fraile, H. O. U. Fynbo, D. Galaviz, L. R. Gasques, G. S. Giri, M. Huyse, S. Hyldegaard, K. Jungmann, W. L. Kruithof, M. Lantz, A. Perea, K. Riisager, A. Saastamoinen, B. Santra, P. D. Shidling, M. Sohani, A. J. Sørensen, O. Tengblad, E. Traykov, D. J. van der Hoek, P. V. Duppen, O. O. Versolato, and H. W. Wilschut. *Precise Determination of the Unperturbed <sup>8</sup>B Neutrino Spectrum*. Physical Review Letters **108**, 162502 (2012), URL http://dx.doi.org/10.1103/physrevlett.108.162502
- M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Domínguez-Reyes, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. Jeppesen, B. Jonson, O. S. Kirsebom, M. Madurga, A. Maira, A. Muñoz-Martín, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrion. Properties of 12C resonances determined from the <sup>10</sup>B(<sup>3</sup>He, pααα) and <sup>11</sup>B(<sup>3</sup>He, dααα) reactions studied in complete kinematics. Physical Review C 86, 064306 (2012), URL http://dx.doi.org/10.1103/physrevc.86.064306
- O. S. Kirsebom and B. Davids. One fewer solution to the cosmological lithium problem. Physical Review C 84, 058801 (2011), URL http://dx.doi.org/10.1103/physrevc.84.058801
- O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. New β-delayed proton lines from <sup>23</sup>Al. The European Physical Journal A 47, 130 (2011), URL http://dx.doi.org/10.1140/epja/i2011-11130-4
- O. S. Kirsebom, S. Hyldegaard, M. Alcorta, M. J. G. Borge, J. Büscher, T. Eronen, S. Fox, B. R. Fulton, H. O. U. Fynbo, H. Hultgren, A. Jokinen, B. Jonson, A. Kankainen, P. Karvonen, T. Kessler, A. Laird, M. Madurga, I. Moore, G. Nyman, H. Penttilä, S. Rahaman, M. Reponen, K. Riisager, T. Roger, J. Ronkainen, A. Saastamoinen, O. Tengblad, and J. Ästö. Precise and accurate determination of <sup>8</sup>B decay spectrum. Physical Review C 83, 065802 (2011), URL http://dx.doi.org/10.1103/physrevc.83.065802
- E. Tengborn, A. M. Moro, T. Nilsson, M. Alcorta, M. J. G. Borge, J. Cederkäll, C. Diget, L. M. Fraile, H. O. U. Fynbo, J. Gomez-Camacho, H. B. Jeppesen, H. T. Johansson, B. Jonson, O. S. Kirsebom, H. H. Knudsen, M. Madurga, G. Nyman, A. Richter, K. Riisager, G. Schrieder, O. Tengblad, N. Timofeyuk, M. Turrion, D. Voulot, and F. Wenander. The \*\(^8Li + ^2H\) reaction studied in inverse kinematics at 3.15

- MeV/nucleon using the REX-ISOLDE post-accelerator. Physical Review C 84, 064616 (2011), URL http://dx.doi.org/10.1103/physrevc.84.064616
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Dominguez-Reyes, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, S. Hyldegaard, B. Jonson, M. Madurga, A. M. Martin, T. Nilsson, G. Nyman, A. Perea, K. Riisager, and O. Tengblad. Breakup of <sup>12</sup>C resonances into three α particles. Physical Review C 81, 064313 (2010), URL http://dx.doi.org/10.1103/physrevc.81.064313
- S. Hyldegaard, M. Alcorta, B. Bastin, M. J. G. Borge, R. Boutami, S. Brandenburg, J. Büscher, P. Dendooven, C. A. Diget, P. V. Duppen, T. Eronen, S. P. Fox, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, J. Huikari, M. Huyse, H. B. Jeppesen, A. S. Jokinen, B. Jonson, K. Jungmann, A. Kankainen, O. S. Kirsebom, M. Madurga, I. Moore, A. Nieminen, T. Nilsson, G. Nyman, G. J. G. Onderwater, H. Penttil, K. Perjrvi, R. Raabe, K. Riisager, S. Rinta-Antila, A. Rogachevskiy, A. Saastamoinen, M. Sohani, O. Tengblad, E. Traykov, Y. Wang, K. Wilhelmsen, H. W. Wilschut, and J. Äystö. R-matrix analysis of the β decays of <sup>12</sup>N and <sup>12</sup>B. Physical Review C 81, 024303 (2010), URL http://dx.doi.org/10.1103/physrevc. 81.024303
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Dominguez-Reyes, L. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, G. Garcia, S. Hyldegaard, H. Jeppesen, B. Jonson, P. Joshi, M. Madurga, A. Maira, A. Muñoz, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrion. Observation of γ-delayed 3α breakup of the 15.11 and 12.71 MeV states in <sup>12</sup>C. Physics Letters B 680, 44–49 (2009), URL http://dx.doi.org/10.1016/j.physletb.2009.08.034
- S. Hyldegaard, C. Forssén, C. Diget, M. Alcorta, F. Barker, B. Bastin, M. Borge, R. Boutami, S. Brandenburg, J. Bscher, P. Dendooven, P. V. Duppen, T. Eronen, S. Fox, B. Fulton, H. Fynbo, J. Huikari, M. Huyse, H. Jeppesen, A. Jokinen, B. Jonson, K. Jungmann, A. Kankainen, O. Kirsebom, M. Madurga, I. Moore, P. Navrátil, T. Nilsson, G. Nyman, G. Onderwater, H. Penttil, K. Perjrvi, R. Raabe, K. Riisager, S. Rinta-Antila, A. Rogachevskiy, A. Saastamoinen, M. Sohani, O. Tengblad, E. Traykov, J. Vary, Y. Wang, K. Wilhelmsen, H. Wilschut, and J. Äystö. Precise branching ratios to unbound <sup>12</sup>C states from <sup>12</sup>N and <sup>12</sup>B β-decays. Physics Letters B **678**, 459–464 (2009), URL http://dx.doi.org/10.1016/j.physletb. 2009.06.064
- M. Alcorta, O. S. Kirsebom, M. Borge, H. Fynbo, K. Riisager, and O. Tengblad. A complete kinematics approach to study multi-particle final state reactions. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 605, 318–325 (2009), URL http://dx.doi.org/10.1016/j.nima.2009.03.246
- M. Madurga, M. Borge, M. Alcorta, L. Fraile, H. Fynbo, B. Jonson, O. S. Kirsebom, G. Martínez-Pinedo, T. Nilsson, G. Nyman, A. Perea, A. Poves, K. Riisager, O. Tengblad, E. Tengborn, and J. V. der Walle. Evidence of a new state in <sup>11</sup>Be observed in the <sup>11</sup>Li beta-decay. Physics Letters B 677, 255–259 (2009), URL http://dx.doi.org/10.1016/j.physletb.2009.05.050
- H. O. U. Fynbo, R. Álvarez-Rodríguez, A. S. Jensen, O. S. Kirsebom, D. V. Fedorov, and E. Garrido. Three-body decays and R-matrix analyses. Physical Review C 79, 054009 (2009), URL http://dx.doi.org/10.1103/physrevc.79.054009
- M. Madurga, M. J. G. Borge, M. Alcorta, L. M. Fraile, H. O. U. Fynbo, B. Jonson, O. S. Kirsebom, T. Nilsson, G. Nyman, A. Perea, K. Riisager, O. Tengblad, E. Tengborn, and J. V. der Walle. *Kinematic identification of the βt branch in the decay of <sup>11</sup>Li*. The European Physical Journal A **42**, 415 (2009), URL http://dx.doi.org/10.1140/epja/i2008-10769-0
- R. Álvarez-Rodríguez, A. S. Jensen, E. Garrido, D. V. Fedorov, H. O. U. Fynbo, and O. S. Kirsebom. *Three-Body Decays: Structure, Decay Mechanism and Fragment Properties.* Few-Body Systems **45**, 149–152 (2009), URL http://dx.doi.org/10.1007/s00601-009-0010-2

## Feature Articles

O. Kirsebom. At eksplodere eller at implodere? Aktuel Naturvidenskab 4-2020, 21-25 (2020)

- O. Kirsebom, F. Frazao, I. Hessler, and S. Matwin. Towards Versatile and Adaptive Detection Algorithms in Underwater Acoustics. The Journal of Ocean Technology 14, 144–145 (2019)
- O. S. Kirsebom. Watching the Hoyle State Fall Apart. Physics 10, 103 (2017), URL http://dx.doi.org/10.1103/physics.10.103
- D. Jenkins and O. S. Kirsebom. *The secret of life*. Physics World **26**, 23–26 (2013), URL http://dx.doi.org/10.1088/2058-7058/26/02/32

# Conference Proceedings

- D. Nguyen, O. S. Kirsebom, F. Frazo, R. Fablet, and S. Matwin. Recurrent Neural Networks with Stochastic Layers for Acoustic Novelty Detection. In ICASSP 2019 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pages 765–769. ISSN 2379-190X (2019), URL http://dx.doi.org/10.1109/ICASSP.2019.8682901
- J. A. Swartz, H. O. U. Fynbo, K. L. Andersen, M. Munch, and O. S. Kirsebom. *Investigating*  $^{16}O$  via the  $^{15}N(p,\alpha)^{12}C$  reaction. AIP Conference Proceedings **2038**, 020014 (2018), URL http://dx.doi.org/10.1063/1.5078833
- R. Garg, C. Barton, C. A. Diget, S. Courtin, G. Fruet, H. O. U. Fynbo, A. Howard, A. Illana, D. G. Jenkins, I. Marroquin, O. S. Kirsebom, M. V. Lund, I. Moore, A. Perea, J. Refsgaard, J. E. Riley, S. Rinta-Antila, L. Sinclair, and O. T. and. *Rotational excitation of the Hoyle state in <sup>12</sup>C.* Journal of Physics: Conference Series **940**, 012043 (2018), URL http://dx.doi.org/10.1088/1742-6596/940/1/012043
- O. S. Kirsebom. Experimental progress in clarifying the excitation spectrum of <sup>12</sup>C. Journal of Physics: Conference Series 863, 012018 (2017), URL http://dx.doi.org/10.1088/1742-6596/863/1/012018
- M. J. G. Borge, V. Pesudo, E. Nácher, O. Tengblad., M. Cubero., A. Perea, A. M. Moro, J. A. Lay, J. Gómez-Camacho., M. A. G. Alvarez, J. P. Fernandez-Garcia, A. D. Prieto, P. Figuera, M. Fisichella., M. Lattuada., V. Scuderi, G. Marquínez-Durán, I. Martel., A. M. Sánchez-Benítez, M. Alcorta., P. C. Bender, R. Braid., A. B. Garnsworthy, G. Hackman., D. Miller., M. Moukaddam., M. Rajabali., C. Unsworth., Z. Wang, B. R. Fulton, U. Hager, O. Kirsebom, K. Kuhn., P. O'Malley., F. Sarazin, and C. Svensson. Scattering Of The Halo Nucleus <sup>11</sup>Be On A <sup>197</sup>Au Target At Energies Around The Coulomb Barrier. In Proceedings of The 26th International Nuclear Physics Conference PoS(INPC2016). Sissa Medialab (2017), URL http://dx.doi.org/10.22323/1.281.0207
- S. Courtin, G. Fruet, D. G. Jenkins, M. Heine, D. Montanari, L. G. Morris, G. Lotay, P. H. Regan, O. S. Kirsebom, S. D. Negra, F. Hammache, N. de Sereville, B. Bastin, F. de Oliveira, G. Randisi, C. Stodel, C. Beck, and F. Haas. Fusion Cross Sections of Astrophysics Interest Within the STELLA Project. In Proceedings of the 14th International Symposium on Nuclei in the Cosmos (NIC2016). Journal of the Physical Society of Japan (2017), URL http://dx.doi.org/10.7566/jpscp.14.021001
- O. S. Kirsebom, I. M. Alonso, T. Berry, M. J. G. Borge, E. R. Christensen, D. Doherty, P. D. Fernández, M. M. Flores, H. O. U. Fynbo, M. C. Gallardo, N. Hubbard, J. H. Jensen, H. Johansson, B. Jonson, R. Lica, M. V. Lund, A. P. Martínez, M. K. Munch, K. Riisager, O. Sorlin, J. A. Swartz, O. Tengblad, and V. Vedia. Improved experimental determination of the branching ratio for β-delayed α decay of <sup>16</sup>N. EPJ Web of Conferences 165, 01031 (2017), URL http://dx.doi.org/10.1051/epjconf/201716501031
- O. S. Kirsebom, J. Cederkäll, D. G. Jenkins, P. Joshi, R. Julin, A. Kankainen, T. Kibédi, O. Tengblad, and W. H. Trzaska. Towards an Experimental Determination of the Transition Strength Between the Ground States of <sup>20</sup>F and <sup>20</sup>Ne. In Proceedings of the 14th International Symposium on Nuclei in the Cosmos (NIC2016). Journal of the Physical Society of Japan (2017), URL http://dx.doi.org/10.7566/jpscp. 14.021008
- S. Courtin, C. Jiang, G. Fruet, M. Heine, D. Jenkins, P. Adsley, L. Morris, P. Regan, M. Rudigier, D. Montanari, S. D. Negra, N. de Séréville, F. Haas, F. Hammache, O. Kirsebom, J. Lesrel, A. Meyer, D. Montanari, K. Auranen, M. Avila, A. Ayangeakaa, B. Back, S. Bottoni, M. Carpenter, C. Dickerson, B. DiGiovine,

- J. Greene, D. Henderson, C. Hoffman, R. Janssens, B. Kay, S. Kuvin, T. Lauritsen, R. Pardo, K. Rehm, D. Santiago-Gonzalez, J. Sethi, D. Seweryniak, R. Talwar, C. Ugalde, S. Zhu, C. Deibel, S. Marley, D. Bourgin, C. Stodel, A. Lefebvre-Schuhl, S. Almaraz-Calderon, X. Fang, X. Tang, M. Alcorta, B. Bucher, M. Albers, and P. Bertone. *Cross section measurements in the*  $^{12}C + ^{12}C$  system. EPJ Web of Conferences 165, 01015 (2017), URL http://dx.doi.org/10.1051/epjconf/201716501015
- G. Fruet, S. Courtin, D. G. Jenkins, M. Heine, D. Montanari, L. G. Morris, P. Adsley, C. Beck, S. D. Negra, F. Haas, F. Hammache, O. S. Kirsebom, A. Meyer, P. H. Regan, M. Rudiger, N. de Séréville, and C. Stodel. Fusion cross section measurements of astrophysical interest for light heavy ions systems within the STELLA project. EPJ Web of Conferences 163, 00018 (2017), URL http://dx.doi.org/10.1051/epjconf/201716300018
- V. Pesudo, M. J. G. Borge, A. M. Moro, J. A. Lay, E. Nácher, J. Gómez-Camacho, O. Tengblad, L. Acosta, M. Alcorta, M. Alvarez, C. Andreoiu, P. Bender, R. Braid, M. Cubero, A. D. Pietro, J. P. Fernández-García, P. Figuera, M. Fisichella, B. R. Fulton, A. Garnsworthy, G. Hackman, U. Hager, O. S. Kirsebom, K. Kuhn, M. Lattuada, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, C. Unsworth, and Z. M. Wang. Scattering of halo nuclei on heavy targets at energies around the Coulomb barrier: The case of <sup>11</sup>Be on <sup>197</sup>Au. EPJ Web of Conferences 163, 00045 (2017), URL http://dx.doi.org/10.1051/epjconf/201716300045
- M. Heine, S. Courtin, G. Fruet, D. Jenkins, D. Montanari, P. Adsley, C. Beck, S. D. Negra, P. Dené, F. Haas, F. Hammache, G. Heitz, O. Kirsebom, M. Krauth, J. Lesrel, A. Meyer, L. Morris, P. Regan, M. Richer, M. Rudigier, N. de Séréville, and C. Stodel. Sub-barrier fusion cross section measurements with STELLA. EPJ Web of Conferences 165, 01029 (2017), URL http://dx.doi.org/10.1051/epjconf/201716501029
- I. Marroquin, M. Borge, A. Ciemny, H. de Witte, L. Fraile, H. Fynbo, A. Garzón-Camacho, A. Howard, H. Johansson, B. Jonson, O. Kirsebom, G. Koldste, R. Lica, M. Lund, M. Madurga, C. Mazzocchi, C. Mihai, M. Munch, S. Nae, E. Nacher, A. Negret, T. Nilsson, A. Perea, J. Refsgaard, K. Riisager, E. Rapisarda, C. Sotty, M. Stanoiu, O. Tengblad, A. Turturica, and M. Vedia. Multi-particle Emission from <sup>31</sup>Ar at ISOLDE. Acta Physica Polonica B 47, 747 (2016), URL http://dx.doi.org/10.5506/aphyspolb.47.747
- O. S. Kirsebom, H. O. U. Fynbo, A. M. Howard, and K. L. Laursen. Applying new tools to old problems: experimental studies of resonances in <sup>12</sup>C. Journal of Physics: Conference Series **569**, 012013 (2014), URL http://dx.doi.org/10.1088/1742-6596/569/1/012013
- K. L. Laursen, H. O. U. Fynbo, A. M. Howard, and O. S. Kirsebom. Complete kinematics study of the  $p+{}^{11}B \rightarrow {}^{12}C$  reaction. Journal of Physics: Conference Series **569**, 012073 (2014), URL http://dx.doi.org/10.1088/1742-6596/569/1/012073
- V. Pesudo, M. J. G. Borge, A. Moro, E. Nacher, L. Acosta, M. Alcorta, M. A. G. Alvarez, G. Ball, P. Bender, R. Braid, M. Cubero, A. di Pietro, J. Fernandez-Garcia, P. Figuera, M. Fisichella, B. R. Fulton, A. B. Garnsworthy, J. Gomez-Camacho, G. Hackman, O. S. Kirsebom, K. Kuhn, R. Krecken, M. Lattuada, J. Lay, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, O. Tengblad, C. Unsworth, and Z. Wang. Reaction of the Halo Nucleus <sup>11</sup>Be on Heavy Targets at Energies Around the Coulomb Barrier. Acta Physica Polonica B 45, 375 (2014), URL http://dx.doi.org/10.5506/aphyspolb.45.375
- O. S. Kirsebom.  $^{12}C$  and the triple- $\alpha$  reaction rate. Journal of Physics: Conference Series 436, 012072 (2013), URL http://dx.doi.org/10.1088/1742-6596/436/1/012072
- C. A. Diget, H. O. U. Fynbo, K. L. Laursen, K. O. Madsbøl, L. Jørgensen, O. S. Kirsebom, and K. Riisager. Complete kinematics measurement of the  $^{11}B(p,\gamma)3\alpha$  reaction. Journal of Physics: Conference Series **381**, 012116 (2012), URL http://dx.doi.org/10.1088/1742-6596/381/1/012116
- O. S. Kirsebom. Decay of  $^{12}C^*$  into Three  $\alpha$  Particles. Few-Body Systems **54**, 755–759 (2012), URL http://dx.doi.org/10.1007/s00601-012-0441-z

- M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Dominguez-Reyes, L. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. B. Jeppesen, B. Jonson, O. S. Kirsebom, M. Madurga, A. Maira, A. Muñoz, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrion. Properties of resonances in <sup>12</sup>C above the triple-alpha threshold. Journal of Physics: Conference Series 312, 092013 (2011), URL http://dx.doi.org/10.1088/1742-6596/312/9/092013
- O. Kirsebom, H. O. Fynbo, H. H. Knudsen, K. Riisager, B. R. Fulton, A. Laird, S. P. Fox, M. J. G. Borge, M. Madurga, O. Tengblad, M. Alcorta, B. Jonson, G. Nyman, H. Hultgren, R. Raabe, J. Büscher, A. Saastamoinen, A. Jokinen, I. D. Moore, and J. Äystö. The <sup>8</sup>B neutrino spectrum. In Proceedings of 11th Symposium on Nuclei in the Cosmos PoS(NIC XI). Sissa Medialab (2011), URL http://dx.doi.org/10.22323/1.100.0016
- M. Alcorta, M. J. G. Borge, M. Cubero, R. Dominguez-Reyes, L. Fraile, B. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. Jeppesen, B. Jonson, O. Kirsebom, M. Madurga, A. Maira, A. Muñoz, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, M. Turrioń, M. Milin, T. Niksic, S. Szilner, and D. Vretenar. Nuclear Structure of <sup>12</sup>C from Break-up Studies in Complete Kinematics. In AIP Conference Proceedings. AIP (2009), URL http://dx.doi.org/10.1063/1.3232093
- H. O. U. Fynbo, C. A. Diget, S. Hyldegaard, H. B. Jeppesen, H. H. Knudsen, O. Kirsebom, K. Riisager, M. Alcorta, R. Boutami, M. J. G. Borge, M. Madurga, O. Tengblad, S. Brandenburg, P. Dendooven, K. Jungmann, G. J. G. Onderwater, A. Rogachevskly, M. Sohani, E. Traykov, H. W. Wilschut, J. Büscher, P. V. Duppen, M. Huyse, R. Raabe, T. Eronen, J. Huikary, A. Jokinen, A. Kankainen, K. Perajärvi, I. Moore, A. Nieminen, H. Penttil, S. Rinta-Antila, A. Saastamoinen, Y. Wang, J. Äystö, B. Jonson, T. Nilsson, G. Nyman, K. Wilhelmsen, B. Fulton, S. Fox, and F. C. Barker. The β-decay approach for studying <sup>12</sup>C. Journal of Physics: Conference Series 111, 012003 (2008), URL http://dx.doi.org/10.1088/1742-6596/111/1/012003

## Software

- F. Frazao and O. S. Kirsebom. ketos (2019), URL https://pypi.org/project/ketos/
- M. Munch, O. S. Kirsebom, and J. Refsgaard. Open R-matrix (2018), URL http://dx.doi.org/10.5281/zenodo.1174079
- M. Munch, J. H. Jensen, and O. S. Kirsebom. simX (2018), URL http://dx.doi.org/10.5281/zenodo. 1320121